

**245-WP-001-001**

# **Reliability, Maintainability, and Availability (RMA) Analysis for the ECS Project**

**White Paper**

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## **RESPONSIBLE AUTHOR**

William Wyman /s/  
William Wyman, ILS Manager  
EOSDIS Core System Project

2/11/02  
Date

## **RESPONSIBLE OFFICE**

Valecia Maclin /s/  
Valecia Maclin, Director Systems Engineering  
EOSDIS Core System Project

2/11/02  
Date

Raytheon Company  
Upper Marlboro, Maryland

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## **Abstract**

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The purpose of this paper is to clarify, resolve, and document concerns and issues involving RMA topics that are not satisfied, particularly those regarding the consideration of RMA analyses involving software related failures. Its is also intended to document the process to be use to collect and analyze the data to determine whether or not the system meets requirements for “sell off” the system to the customer in a satisfactory manner.

**Keywords:** Reliability, Maintainability, Availability, Analysis, RMA

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## **Abstract**

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# **1. Introduction**

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## **1.1 Purpose**

The purpose of this paper is to clarify, resolve, and document concerns and issues involving RMA topics that are not satisfied, particularly those regarding the consideration of RMA analyses involving software related failures. It is also intended to document the process to be used to collect and analyze the data to determine whether or not the system meets requirements for “sell off” the system to the customer in a satisfactory manner.

## **1.2 Organization**

This paper is organized as follows: A discussion of the ECS RMA approach, followed by tables showing software to hardware mapping for the ECS system.

## **1.3 Review and Approval**

This White Paper is an informal document approved at the Office Manager level. It does not require formal Government review or approval; however, it has been submitted to the Government in a draft form and the Government's comments are included in the final paper.

The ideas expressed in this White Paper are valid until the end of the ECS contract. The concepts presented here will migrate into the RMA ticket and RMA PIs and WIs.

Questions regarding technical information contained within this Paper should be addressed to the following ECS and/or GSFC contacts:

- ECS Contacts
  - Randy Miller, Chief Engineer, 301-858-0400, [randallm@eos.hitc.com](mailto:randallm@eos.hitc.com)
  - Ken Simmons, RMA Engineer, 301-925-0826, [ksimmons@eos.hitc.com](mailto:ksimmons@eos.hitc.com)
  - Bill Wyman, ILS Manager, 301-925-0705, [wwyman@eos.hitc.com](mailto:wwyman@eos.hitc.com)

Questions concerning distribution or control of this document should be addressed to:

Data Management Office  
The ECS Project Office  
Raytheon Systems Company  
1616 McCormick Drive  
Upper Marlboro, Maryland 20774-5301

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## **2. Overview of Approach**

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### **2.1 Concept of Operations**

An overview of the operational flow diagram for failure data collection and processing is provided in Appendix D, Section 4.4. The existing hardware data collection and analysis that occurs through the MWO process will continue without change and is NOT effected by the activities described in this paper. The operations described in this paper refer primarily to hard software failures and software stability problems.

#### **2.1.1 DAAC Failure Data Collection Process**

##### **2.1.1.1 Modified Failure Data Collection Parameters**

Examination and comparison of the failure data currently being collected in the ECS Operations Down Time log and the failure data required for enhanced RMA calculations reveals that only two changes need to be made. The current ECS Operations Down Time log(s) should continue to be used to collect failure data with the following modifications:

- The site location should be stated explicitly in the Ops down time log database for each DAAC and reported to the FRB. This is required when the failure data is aggregated for all sites.
- The ops down time log database fields should be expanded to include Machine ID & Server ID which is derived from the Function Mapping Database.

By modifying the existing Function Codes, operators can track failures to each of the required functions. Each of the DAACs needs to implement and monitor failure data collection using the modified failure data collection tool and provide the data to the FRB through the Software Failure Database which feeds into the RMA analysis process. This should include all failure data that meets Chargeable Down Time (CDT) criteria.

The Modified ECS Operations Downtime failure collection data log should contain the following fields:

Site (GSFC, EDC, LaRC, NSIDC, SMC) (required when data is aggregated from all sites)

Event # (sequenced by date)

Function Type (scheduled/ unscheduled)

Function Code (see below)

Machine ID (e.g., e0mss02)

Server ID

Date and Time of Failure (operator observed and logged)

Date and Time of Recovery (operator observed and logged)

Total Down Time (calculation) (more than 30 minute/occurrence trigger surpassed)

Problem description/ Failure Reason/ Justification/ TT# (if applicable)/Comments

The current Function Code group and subgroups should be modified to be as shown in Table 2.1.

**Table 2-1. Function Group and Subgroup Codes (1 of 2)**

Code	Group	Subgroup
100	Customer Interface	
101		Data Search MTMGW
102		Data Search EDG
103		Data Search ASTER GDS
104		Data Order MSMGW
105		Data Order EDG
106		Data Order ASTER GDS
107		Data Order L7
108		Browse EDG
109		Browse JDT
110	User Registration	
200	Ingest & Archive: sources	
201		EDOS (All)
202		XDAAC
203		MODAPS
204		EMOS
205		DAO
206		FDS/FDD
207		Ancillary
208		MOPITT
209		ACRIM
210		Landsat 7 (All)
211		ASTER
212		MODIS
300	Production by instrument: planning, data staging, PGE execution, data de-staging, and subscription	5 parts / instrument?
301		AM MODIS
302		PM MODIS
303		AIRS
304		MISR
305		MOPITT
306		ASTER
400	Fulfillment: Distribution & order track	
401		FTP Push
402		FTP Pull
403		8 mm (All)
404		DLT
405		CD-ROM
406		DVD
407		L7 subsetting
408		ASTER & MODIS
500	Archive/ Data Management	
600	Software Upgrades & Patches	
610	Server/Machine Restart	
700	Hardware Maintenance	
710	Hardware Configuration Changes	
800	Scheduled PM (Weekly)	

**Table 2-1. Function Group and Subgroup Codes (2 of 2)**

Code	Group	Subgroup
990	Critical Failure (NO Functionality)	
1000	Facilities Related	
1001		Power
1002		HVAC

Instructions and procedures will be provided to all DAAC operators and LMCs by the EDFM&O SOS for including the required failure data in the ECS Operations down time log. All failures meeting failure data scrub criteria should be reported to the FRB on the current reporting schedule. Software stability failure data shall also be scrubbed for appropriateness prior to presentation to the regularly scheduled FRB meetings and will be provided through the Software Failure Database. The data format shall be the same as the current hardware data format. The FRB shall verify the function(s) involved and whether or not failures “count” towards chargeable down time.

#### **2.1.1.2 Modified Software Stability Data Collection Parameters**

Software stability data will be captured and analyzed separately from hardware failure data. The relationship between the cause and effect of server cores, hangs, dumps, etc. over a period of time can be very difficult to determine. The intent in analyzing this data is to make the system more stable in order to free up resources that are otherwise used to bring the system back on-line. Corrective action may require an NCR or a trouble ticket be written to evaluate and track the resolution of the problem.

Examination and comparison of the failure data needed for RMA purposes and the software stability data currently being collected reveals that only two changes need to be made. The current ECS OPS Mode Server/ Machine Restart log should continue to be used to collect software stability data with the following modifications:

- The site location should be stated explicitly in the log for each DAAC and reported to the FRB. This is required when the failure data is aggregated for all sites.
- The fields of the log should be expanded to include machine/ server stop dates and times.

The modified ECS OPS Mode Server/ Machine Restart Log should contain the following fields:

Site (GSFC, EDC, LaRC, MSIDC, SMC) (required when data is aggregated from all sites)

Date & Time of Server/ Machine Stop (operator observed and logged)

Date & Time of Server/ Machine Restart (operator observed and logged)

Total Down Time (calculation)

Server ID

Machine ID

Reason for Restart (core, hang, reset req, planned, other)

Justification (TT#, other references, server size, explanation of ‘other’ reasons)

### **2.1.1.3 Function Mapping to Machines and Servers**

Functions need to be understood in terms of their mapping into hardware and software. Hardware and software failures need to be traced to their effected functions which can then be analyzed and used in RMA calculations. The mapping of RMA-related functions into hardware and software has been developed for the latest software releases (see Appendix E). This mapping data needs to be maintained as the configuration and software releases change and will be used for failure data analysis, the assigning of chargeable down time, and RMA calculations.

### **2.1.1.4 Scheduled Down Time Data**

The DAAC LMC will provide scheduled down time plans/ windows to enable calculation of whether or not SDT windows are exceeded by PMDT or CMDT so the FRB can determine if any associated down time should be counted as chargeable down time.

The FRB (supported by M&O and Systems Engineering) determines if the failure down time data meets the criteria to be counted as chargeable down time.

### **2.1.1.5 Failure Data Collection Tool Modification**

The existing ECS Operations down time log database (spreadsheet) should be modified and utilized to capture the data shown in Section 2.1.1.1 and implemented at all DAAC locations. The existing server/machine restart (stability) log should be modified and utilized to capture the data shown in Section 2.1.1.2 and implemented at all DAAC locations. These changes should have almost no impact on storage requirements.

### **2.1.1.6 Failure Data Implementation at LDAAC & NDAAC**

The failure data (hardware and software) collection process and any unique content needs to be implemented at the LDAAC (LaRC) and NDAAC (NSIDC) (based on the EDC/ GSFC model) to enable a complete assessment of ECS down time, Ao, MDT, and the verification of requirements conformance to be used for system sell-off. Since the operations staff at the NSIDC and the LaRC are not part of the ECS contract, the government will flow the requirements for collecting and analyzing RMA failure data down to those sites. This will involve management, establishing the hardware and software infrastructure, operator training, and processes to collect, store, analyze, and report failure data to the FRB.

### **2.1.1.7 DAAC agreement on Data Collection Process**

Agreement on requirements, content, format, reporting, etc. shall be put in place in time to enable a sufficient period of data collection and analysis to take place in order to verify the requirements are satisfied before the contract end. The current data format used at EDC and GSFC will be the standard used. The data content shall be implemented at all DAACs concurrent with their unique process requirements and forwarded in the appropriate format to the FRB for analysis.

## **2.1.2 Failure Data Reporting**

### **2.1.2.1 Hardware Failure Reporting:**

#### **ILS Functions**

The ILS office produces a consolidated maintenance report of all reported hardware failures. The report consists of an Excel spreadsheet containing the following information: work order, manufacturer, description of the system down, system host name, site, date/time partially capable, total partially capable time, date/time system down, date/time returned to operation, total down time, restore time and problem description. The ILS office reviews, validates, interprets, and analyzes the MWO data received from the LMCs in accordance with relevant Project Instructions (PIs). Any reporting questions or data inconsistencies are resolved directly with the Local Maintenance Coordinator (LMC).

The ILS office performs quantitative failure analysis and uses statistical methods such as frequency distribution, and trend analysis to measure vendor and product performance and provides corrective action feedback to the maintenance planning process.

The ILS office will maintain an Excel Spreadsheet that contains the results of the FRB. The spreadsheet will have both hardware and software entries and will be the input for the system engineering RMA model. The spreadsheet will not be a part of or combined with other ILS spreadsheets, it will be a separate entity titled “FRB Results.”

#### **DAAC LMC Functions**

The DAAC LMC documents and reports all ECS hardware failures as MWOs in the Inventory Logistics Management system. LMC opens an MWO and initiates CM action (calls the responsible hardware maintenance vendor) as soon as notified of a hardware device problem. Certified spares may be used for CM. LMC monitors and participates in CM activities that resolves the problems. LMC inputs maintenance data points and comments into MWO in accordance with ECS policies and procedures contained in DID 611, Mission Operations Procedures (Section 27 - ILM), and ILS MDCS Work Instructions. The completed MWO provides the MDCS data elements that are required for system RMA performance analysis. For software failures, the LMC closes the MWO and annotates this fact in the note block and database.

#### **Software Failure Reporting**

ECS DAACs using the GSFC developed down time collection tool or a tool of their own design will accomplish software failure reporting. Failure data identified in the down time reporting tool will be forwarded to the EDF for further analysis by the EDF RMA engineer. If a DAAC chooses not to use the GSFC developed tool then the DAAC coordinate with the RMA engineer at the EDF to ensure that data being collected and forwarded is compatible with data that would be collected by using the GSFC tool. The report sent to the RMA engineer will be in an access database. The report containins the following information: site ID, event umber, function type, function code, machine ID, server ID, date and time of failure, date and time of recovery, total down time, downtime greater than 30 minutes, and other comments including reason, justification, or other pertinent information needed by the FRB.

The DAAC operations staff will also map software failures to the functions shown in Table 1 of the MDCS PI, and report failures that meet the reporting criteria shown in paragraph 6 of that PI.

The EDF RMA engineer function will review software failures reported from the DAACs and verify the validity of the data reported. The RMA engineer will serve as a member of the FRB and will report software failures to the FRB by validating the functions reported by the DAACs, verifying the start and stop times, and preparing recommendations as to the amount of down time to be assessed.

The ILS office will maintain FRB approved hardware and software failure data on the “U” drive in an Excel Spreadsheet titled “FRB Results”. (see above) The spreadsheet and will be the part of the input used by the RMA engineer to compute Ao and MDT for ECS threads..

### **2.1.3 Failure Data Analyses**

#### **2.1.3.1 DAAC ILS Failure Data Analysis**

At each of the DAACs, the DAAC operations/ engineering organization must scrub the collected failure data to determine which data needs to be forwarded to the FRB to determine considered chargeable down time and, therefore, must be included in the RMA calculations. The following actions/criteria are to be used to judge what data needs to be forwarded to the FRB:

An ECS component must contribute to a service interruption, and the occurrence must happen during staffed DAAC operating hours.

Compare failure data with the functional mapping matrix to hardware and software and determine/ trace what RMA-related function(s) have suffered a failure. The functional mapping is found in the Functional Mapping database.

From the start and stop dates/ times for all hardware and software failures, calculate the total down time and enter this into the ECS Operations down time log/ database.

If a function’s throughput capacity (software and/or hardware) is less than 25 percent of normal operations and is unavailable for more than 30 minutes in any single occurrence, log this information and provide all relevant data for each such event to the FRB.

If a function’s throughput capacity (software and/or hardware) is less than 25 percent of normal operations and is unavailable for an accumulated down time of more than 2 hours per day, log this information and provide all relevant data for each such event to the FRB. The 2 hours per day criteria is intended to be a guide to help discover recurring problems and is a subjective value whose interpretation is left to the discretion of the operators and LMCs.

If both the single occurrence and 24 hour occurrence criteria are exceeded, the 24 hour occurrence down time shall be indicated for use in the RMA down time calculations.

Compare PMDT and CMDT with SDT, calculate if PMDT or CMDT lies outside of SDT (see CDT criteria). (The SDT data is found in the Scheduled Down Time database.) IF CDT criteria is met, log this information and provide all relevant data for each such event to the FRB.

#### **2.1.3.2 Server/ Machine Stability Calculations**

The DAAC LMC will perform quantitative failure and stability analyses on machine/ server failures/ restarts using statistical methods, such as frequency distribution and trend analysis, to measure software performance and to provide corrective feedback to the software design and development correction process.

### **2.1.3.3 Failure Review Board**

#### **ECS FRB Charter**

The FRB consists of personnel from the ILS office, M&O SOS office, Chief Engineer, Systems Engineering, Hardware Engineering, Software Engineering/ Development, Sustaining Engineering, Q&A, ESDIS, DAAC LMCs (if required), and invitees with other relevant technical or operational expertise. The FRB is chaired by the M&O ILS Manager. The FRB reviews and validates the Software Failure Database as well as the ILS consolidated maintenance report and all failure event classifications, elapsed time computations, and partially capable designations. The FRB also validates that the assignment of partially capable hours to a failure event is appropriate for the configuration of its ECS function.

The FRB ensures that all hardware & software failures are investigated, analyzed, and their causes determined and makes the final determination of chargeable down time in a consistent manner. It analyzes all hardware and software failure data to determine if NCRs are warranted. It also reviews the quantitative failure analysis performed by the ILS office and any corrective/ preventive actions.

#### **FRB Chargeable Down Time Analysis**

All hardware and software failures meeting the initial hardware M&O ILS scrub and reported by each DAAC will be reviewed by the FRB. Down times reported in the MWO and the Software Failures Database are reviewed and assigned as “chargeable” by the FRB. The FRB will use the following rules and assumptions when determining whether or not down time is chargeable down time (CDT).

Chargeable Down Time (CDT) is down time used in RMA calculations which is unscheduled down time or down time that exceeds SDT allocations and includes PMDT, CMDT, ALDT, switchover time, time to repair, and restore time.

- Down time will only be assessed during normal DAAC operating hours.
- Down time caused by external factors beyond the control of ECS will not count as CDT.
- If more than 75 percent of throughput capacity for a function is down, then the entire function is down.
  - Partially capable time does not count as down time unless the capability drops below 25 percent.
- CDT must effect ECS operations and make more than 75 percent of a function’s throughput capacity unavailable for more than 30 minutes for a single occurrence before it is used in RMA calculations (an outage).
- CDT must effect ECS operations and make more than 75 percent of a function’s throughput capacity unavailable for more than 2 hours per day (cumulative) before it is used in RMA calculations.
  - If both the 30 minute single occurrence and cumulative 2 hours per day criteria are exceeded, the 24 hour occurrence down time shall be used in the RMA down time calculations.
- PMDT and CMDT are only included in RMA down time calculations if they occur outside of SDT, and only the portion(s) occurring outside of SDT are included, unless the down time begins prior to the SDT window.
  - PM and CM only apply to HW.

- If the later case occurs, all of the PMDT or CMDT would be counted toward CDT.
- Restore Time (RT) associated with corrective maintenance actions will be assessed as CDT if the CM is determined to be chargeable or the RT goes beyond a SDT period.
- Switchover (failover) time becomes chargeable down time when there is an interruption of the function caused by switching to the backup component.

## **Systems Engineering Analysis**

Working through the FRB, Systems Engineering performs RMA calculations and produces the Ao and MDT performance measures. Ao and MDT are computed according to the ECS Availability Math Models, as found in Section 6 of DID-151, and reported monthly based on the latest 12 month moving window. Ao and MDT statistics are generated for each DAAC (GDAAC, EDAAC, LDAAC, and NSIDC), for the SMC, and for each function as defined in Appendix C. The DAAC ILS office provides the ECS Operations Downtime Log and the ECS OPS Mode Server/ Machine Log for use in these calculations.

## **2.2 RMA Database**

### **2.2.1 Failure Data Repository**

A standardized model for function-level hardware and software failure data will be used at all DAAC sites to store/ archive the data in analyzable format. The format of the data that is stored in the repository will be the same as currently used at EDC and GSFC.

### **2.2.2 Mapping Data Repository**

The mapping data that links ECS functions to machines and servers will be stored in the Function Mapping Database for use by the DAAC operators, the LMCs, and the FRB. The data repository must be maintained with the current configuration and system software release data.

The mapping data will be generated and maintained by the M&O ILS office at each DAAC. Whenever a new software release or a configuration change is implemented at each DAAC, the old database information will be archived for a TBD period of time and the new database information put into the active database for RMA use.

### **2.2.3 CM Control**

The mapping data in the Function Mapping Database will be configuration controlled to assure the maps are current with the most recent configuration changes and software installation versions. These will be maintained by the M&O ILS office.

## **2.3 New RMA Ticket**

The RMA ticket will completely describe the process of data collection, calculation, and analysis. Links from the ticket to the PI/ WI reference(s) are provided in this section.

TBS

### **3. Taxonomy of Artifacts**

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#### **3.1 Documents**

<u>Number</u>	<u>Title</u>
423-10-01-1	ESDIS Project Level 2 Requirements, Vol. 1: ECS
423-41-02	F&PRS, Section 5.6 Reliability, Maintainability, Availability
515-CD-002	Availability Models/ Predictions for the ECS Project
611-DR-002	CSR-A, Mission Operation Procedures
TBD	Level 3 Baseline Requirements (see Appendix 4.2)
IL-1-010	ECS PI : Maintenance Data Collection System

#### **3.2 Logs/ Reports/ Bulletins/ Databases**

EDAAC-OEB-0026-O-YF	EDAAC Operations Engineering Bulletin: Server/ Machine Restart Logging & Reporting
EDC/SSB/ECS/SOPS	EDAAC Operations Downtime Log Database, and EDC-ECS Ops Mode Server/ Machine Restart Log
EDC/SSB/ECS/SOPS	Goddard DAAC-ECS Ops Mode Server/ Machine Restart Log
N/A	ECS Equipment Maintenance Reports
N/A	Maintenance Work Orders (MWOs)
N/A	Work Order Verification Reports

#### **3.3 Presentations**

ESDIS Presentation (17 November, 2000)

“RMA” as a Function of Downtime, EDAAC point of view, EDAAC M&O, September 9, 2000

EDAAC Stability Monitoring, ESDIS Sustaining Engineering, EDAAC M&O, September 9, 2000

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# Appendix A: RMA-Related Definitions

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**Administrative Logistics Delay Time (ALDT) to Repair:** The delay time which prevents the function from returning to an available state including: delays in the repair of system components due to travel time required for maintenance personnel and test equipment to arrive at the failure location, parts order and delivery time, administrative activities, and other logistics delays. (F&PRS, 5.6.2)

**Availability, Operational (Ao):** The time a function is available when needed in the reporting period time frame divided by the total time in the time frame. Ao is calculated separately for each function, each DAAC, and for specified reporting periods. For ECS,  $Ao = MTBM + (MTBM + MDT)$ . (F&PRS, 5.6.3).

**Configuration Change Maintenance:** Hardware or software maintenance done as a result of scheduled installation or upgrade of components within a server or peripheral.

**Corrective Maintenance (CM):** Maintenance performed to correct a hardware failure including: troubleshooting, fault isolation, removal and replacement of failed line replaceable units (LRUs), time-to-repair, ALDT, adjustment/re-calibration, restore time (including software and/or file restoration), and verification that performance requirements are met.

**Down Time:** Time when a system/ function is unable to perform its regularly scheduled activities.

**Corrective Maintenance Down Time (CMDT):** The unplanned/ unscheduled down time for performing corrective maintenance actions required to correct a hardware failure. CMDT is included in RMA down time calculations only when it meets chargeable down time criteria. CMDT is only hardware related.

**Preventive Maintenance (PM) Down Time (PMDT):** The pre-planned/scheduled down time for performing routine hardware inspections and servicing. PMDT is included in RMA down time calculations only when it meets chargeable down time criteria. PMDT is only hardware related.

**Scheduled Down Time (SDT):** The pre-planned/scheduled down time for performing routine hardware or software patches/upgrades or configuration changes. It does not include down time due to hardware or software failures and is not included in RMA down time calculations. SDT is not the same as PMDT.

**Chargeable Down Time (CDT):** Chargeable down time is assigned by the FRB. Chargeable down time is used in all RMA calculations and includes: CMDT, PMDT, ALDT, switchover time, repair time, and restore time subject to the following criteria:

1. the down time must be caused by an ECS component that contributes to the service interruption,
2. the occurrence must happen during staffed DAAC operating hours,
3. for software events, it must be a service interruption where more than 75 percent of a function's throughput capacity is unavailable for more than 30 minutes in any single occurrence, or where more than 75 percent of a function's throughput capacity is unavailable for more than 2 hours/ day (accumulated down time)
4. In cases where both the single occurrence and 24 hour occurrence criteria are exceeded, the 24 hour occurrence down time shall be used in the RMA down time calculations. All failure events meeting these criteria, including stability NCRs, will be counted toward chargeable down time and included in RMA down time calculations.

5. for hardware events, it must be a service interruption where more than 75 percent of a function's throughput capacity is unavailable anytime. Partial capability (less than 100percent but equal to or greater than 25 percent) does not count toward CDT.

PMDT and CMDT are only included in RMA down time calculations if they occur outside of scheduled down time, and then only the portion(s) occurring outside of scheduled down time are included, unless the down time begins prior to the scheduled down time window. In that case, all of the PMDT or CMDT is included. Switchover (failover) time becomes chargeable down time when there is an interruption of the function caused by switching to the backup component. Down times begin when the operator first becomes aware of the situation and ends when the function returns to normal operation.

Items NOT chargeable as down time for RMA calculations are: external factors beyond ECS control (are not ECS failures), partially capable time, configuration change maintenance time, corrective or preventive maintenance performed entirely during allocated scheduled down time periods, or software reboot periods.

**Mean Down time (MDT):** The summation of each function's chargeable down times divided by the total number of chargeable down time events associated with each function.

**EDF: ECS Development Facility** (Landover, MD)

**Failover Time:** (See Switchover Time)

**Failure:** Failures are those hardware and software malfunctions which result in service interruptions. Function interruptions resulting from external factors beyond the control of ECS are not considered failures unless ECS equipment or software contributes to the interruption. Hardware failures require corrective maintenance action. Software failures may require an NCR.

**Failure Review Board (FRB):** A board consisting of contractor and NASA personnel that review ECS hardware and software failures and who make the determination of chargeable down time and work other RMA related issues. It is chaired by the M&O organization.

**Functions:** A group of hardware items containing major software components that perform a defined activity. For RMA purposes, the ECS functions are defined as: ingest (and archive) by source, production (by instrument), fulfillment (including distribution methods), user registration, data search, data order (via client subscription), and browse.

**Hardware device:** A hardware Configuration Item (CI) in the ECS, such as a server or peripheral.

**Host:** A hardware server or peripheral that is network attached and performs a function in the operation or support of ECS.

**Installation Maintenance:** Maintenance that occurs during the initial installation of new equipment and/or the upgrade of existing equipment.

**(ILS): Integrated Logistics Support**

**(ILM): Inventory Logistics Management**

**Line Replaceable Unit (LRU):** Any component that can be removed or replaced in response to a hardware failure.

**Local Maintenance Coordinator (LMC):** A person assigned to each DAAC who assures that hardware maintenance and software failures are accomplished and that appropriate paperwork is submitted to the EDF for review by the FRB.

**Maintenance Data Collection System (MDCS):** The system and process for collecting and assessing hardware and software failure data.

**Maintenance Work Order (MWO):** The software module in the ILM tool that supports the recording and reporting of hardware device maintenance events. It tracks CM, PM, configuration changes, installation maintenance, equipment locations, and spares replacements.

**Mean Time Between Maintenance (MTBM):** The interval of time that elapses between maintenance tasks on a given system component.  $[1/\text{MTBM} = 1/\text{MTBPM} + 1/\text{MTBCM}]$

**Non-Conformance Report (NCR):** A non-conformance report is used to report selected non-hardware failures. Functional NCRs identify deficient functions from a requirements perspective. Stability NCRs identify functions that work, but may become unavailable at any time.

**Operational:** An ECS function is considered operational when all of the hardware and software components are capable of fulfilling their intended purpose.

**Partially Capable:** When a function is operational at less than 100 percent but no less than 25 percent of designed capacity or performance requirements.

**Preventive Maintenance (PM):** The routine, pre-planned/scheduled activities including inspections and servicing required to keep hardware operational. It does not include hardware or software failures.

**Restore Time (RT):** The time between when corrective maintenance is completed and the time the function is returned to its pre-failure operational state. Restore time is chargeable as down time.

#### **Science Data Processing System (SDPS):**

**Switchover Time (ST):** Time required by a function to restore its operation by switching from failed equipment to backup equipment. Switchover time becomes chargeable down time when there is an interruption of the function caused by switching to the backup component.

**System Component:** A hardware or software element that comprises part of a system.

**System Monitoring & Coordination (SMC):** Part of the CSMS system located at GSFC. It gathers and disseminates system management information, interfacing with the EOSDIS Backbone Network, the External Networks (NSI/NSF), and the EOSDIS Internal Net.

**Time to Repair:** The amount of time it takes maintenance technicians to repair a failure. It does not include ALDT.

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# Appendix B: RMA-Related Requirements

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This appendix focuses primarily on SDPS-related requirements. Inspection of statistical RMA data will be used in requirements verification.

## Reliability Requirements

This section specifies the system-level reliability, maintainability, and available (RMA) requirements for the ECS. The specific RMA requirements stated here are in addition to the overall RMA and other performance assurance requirements of GSFC 420-05-03.

Mean Time Between Preventive Maintenance (MTBPM) and Mean Time Between Corrective Maintenance (MTBCM) each contribute to the calculation of MTBM.

Failures are defined as those hardware and software malfunctions which result in interruptions in service. Interruptions in service resulting from external factors beyond the control of ECS shall not be considered failures unless ECS equipment or software contributes to the interruption.

*The ECS RMA data shall be maintained in a repository accessible for logistics analysis and other purposes. (EOSD3492)*

## Maintainability Requirements

Mean Time To Repair (MTTR) includes corrective maintenance time but not logistics and administrative delays inherent in the ECS maintenance process. Logistics delays include the time required to provide replacement units at the failure location (replacement units shall be presumed to be available on-site). Administrative delays shall include the time required for maintenance personnel and test equipment to arrive at the failure location. Corrective maintenance includes the time required for troubleshooting, fault localization, removal and replacement of failed line replaceable units (LRU), adjustment/re-calibration of repaired equipment, and verification that the specified performance requirements are met.

Mean Down Time (MDT) includes Preventive Maintenance (PM) down time and MTTR plus all delays which prevent the system from returning to an available state, including active repair time, administrative delays, and logistics delays. MDT for ECS components may actually be switchover time to a backup component rather than the time to get the downed component running again. If the MDT for an ECS component is sufficiently small, then a backup capability is required to satisfy the MDT requirement. In such cases the actual down time of a component is of secondary importance when compared to providing a backup capability that can take over for the downed component in the MDT timeframe. In such cases the measured down time of the downed component is the actual switchover time. Of course the downed component must be made available again in a timely fashion to guard against a second failure, in order to satisfy the availability requirement for the component.

*ECS maximum down time shall not exceed twice the required MDT in 99 percent of failure occurrences. (EOSD3630)*

## ECS System-Level RMA Requirements

*ECS functions shall have an operational availability of 0.96 at a minimum (0.998 design goal) and a MDT of four (4) hours or less (1.5 hour design goal), unless otherwise specified (EOSD3700). This covers:*

*“Non-critical” equipment configured with the critical equipment supporting the functional capabilities in the requirements, and equipment providing other functionality not explicitly stated in the RMA requirements that follow.*

*System acceptance shall be based only on specified requirements and not design goals. Reference F&PRS (423-41-02) paragraph 1.5. Satisfied when capacity for all future missions is provided.*

## **SDPS Requirements**

The RMA requirements for the products generation function refer to a failsoft environment. In a failsoft environment, the product generation function continues in a degraded mode when a product generation computer fails since the remaining computers continue to produce products.

*ECS shall be able to recover from 95percent of system failures without losing queued requests. However, disk failures and other hardware failures may result in queued requests being lost. (EOSD3750)*

*Each ECS computer providing product generation shall have an Ao of 0.95 at a minimum (0.9995 design goal). (EOSD4010)*

*At each ECS DAAC site, the product generation functional capabilities shall be spread across multiple product generation computers, thereby providing a “failsoft” environment. (EOSD4020)*

## **CSMS Requirements**

The SMC RMA requirements have been divided into two categories, critical and non-critical. Critical services are those necessary to ensure the SMC can operate on a 24 hour per day basis and those necessary for interactions with the ECS element to maintain the ECS mission. These critical services include the resource management of the configuration management service, the performance management service, the fault management service, the security management service, and directory services. Non-critical services include the scheduling service and all functions of configuration management except the resource management service, accounting/accountability service, and report generation service.

*The ECS network shall have no single point of failure for functions associated with site-specific network databases and configuration data. (EOSD4035)*

*The ECS operational availability of individual network segments shall be consistent with the specified operational availability of the supported ECS functions. (EOSD4036)*

## **Fault Detection and Isolation Requirements**

*The ECS network segments and components shall include the on-line (operational mode) and off-line (test mode) fault detection and isolation capabilities required to achieve the specified operational availability requirements. (EOSD4100)*

## Appendix C: RMA-Related Functions

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***Table C-1. ECS Functions Used for RMA Analyses***

Function	Goddard DAAC	Langley DAAC	EDC DAAC	NSIDC DAAC	SMC
Ingest & Archive: Sources	EDOS	EDOS	Landsat 7	MODAPS	
	XDAAC	XDAAC	XDAAC	EDOS (GLAS)	
	MODAPS	MOPITT	MODAPS	Ancillary	
	EMOS	EMOS	ASTER		
	DAO	ACRIM	L7 CPF		
	FDS/FDD	FDS/FDD	Ancillary		
	Ancillary	Ancillary			
Production: planning, data staging, PGE execution, data de- staging, subscription	Each instrument is a separate thread. Number of instruments = 3	Each instrument is a separate thread. Number of instruments = 2	Each instrument is a separate thread. Number of instruments = 1	N/A	
Fulfillment: Data Distribution & Order Tracking	FTP Push	FTP Push	FTP Push	FTP Push	
	FTP Pull	FTP Pull	FTP Pull	FTP Pull	
	8 mm	8 mm	8 mm	8 mm	
	DLT	DLT	DLT	DLT	
	CD-ROM	CD-ROM	CD-ROM	CD-ROM	
	DVD	DVD	DVD	DVD	
User Registration					
Data Search	MTMGW EDG	MTMGW EDG	MTMGW EDG	MTMGW EDG	ASTER GDS
Data Order	MTMGW EDG	MTMGW EDG	MTMGW EDG L7	MTMGW EDG	ASTER GDS
Browse	EDG	EDG	JDT	EDG	
Total =	22 Functions	21 Functions	20 Functions	15 Functions	3 Funtn

### Function Definitions

There are a total of 81 functions for all of the sites. Removing functional redundancies leaves 33 unique functions. The SMC uses some of the above functions and has been included in the function count. (See matrix by site, Appendix 4.4, for mapping of functions to hardware and software)

### Ingest and Archive

For a site, the ingest function includes all ECS hardware and software required to receive data, store the associated metadata in the Science Data Server database, and archive the data to tape in a silo, for all datatypes processed by that site. It does not include firing of subscriptions based on receipt of the data.

## **Production (including subscription)**

For a site, the production function includes all ECS hardware and software required to enter a production plan, trigger the production plan via the fulfillment of a subscription, retrieve all data required by the production plan from the archive and the Science Data Server, stage all of the required data to a Science Processor, execute the PGEs in the production plan, insert all of the data produced into archive and the Science Data Server database, and provide subscription service to users. Production does not include any SSI&T or QA activities, nor the ingest of the data required, nor the distribution of the data produced.

The instruments for the production function for each site are listed in Table C-2.

***Table C.2 Production Function Instruments***

<b>Goddard DAAC</b>	<b>Langley DAAC</b>	<b>EDC DAAC</b>	<b>NSIDC DAAC</b>
Terra – AM MODIS	Terra - MISR	Terra - ASTER	N/A
Aqua – PM MODIS	Terra - MOPITT		
Aqua - AIRS			

## **Order Tracking and Fulfillment**

For a site, the order tracking and fulfillment function includes FTP Push, FTP Pull, 8 mm, DLT, CD-ROM, and DVD data distribution. The media distribution functions will change when the PDS system is activated for all DAACs to use.

## **User Registration**

TBS

## **Search**

For a site, the search function includes all ECS hardware and software required to search the ECS data archives for any local holding via any media supported by the site.

## **Order**

For a site, the order function includes all ECS hardware and software required to order any local holding from the ECS data archives via any media supported by the site.

## **Browse**

TBS

## **Appendix D: Failures and RMA Process Flow Chart**

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## Chargeable Down Time Criteria

Interruption happens during staffed DAAC operations hours  
 PMDT or CMDT (H/W) exceeds SDT window (criteria)  
 ECS Function is interrupted (throughput capacity < 25%):  
 • anytime for hardware failures  
 • > 30 minutes/ occurrence for software failures  
 • > 2 hours/ day/ function (cumulative) for s/w stability

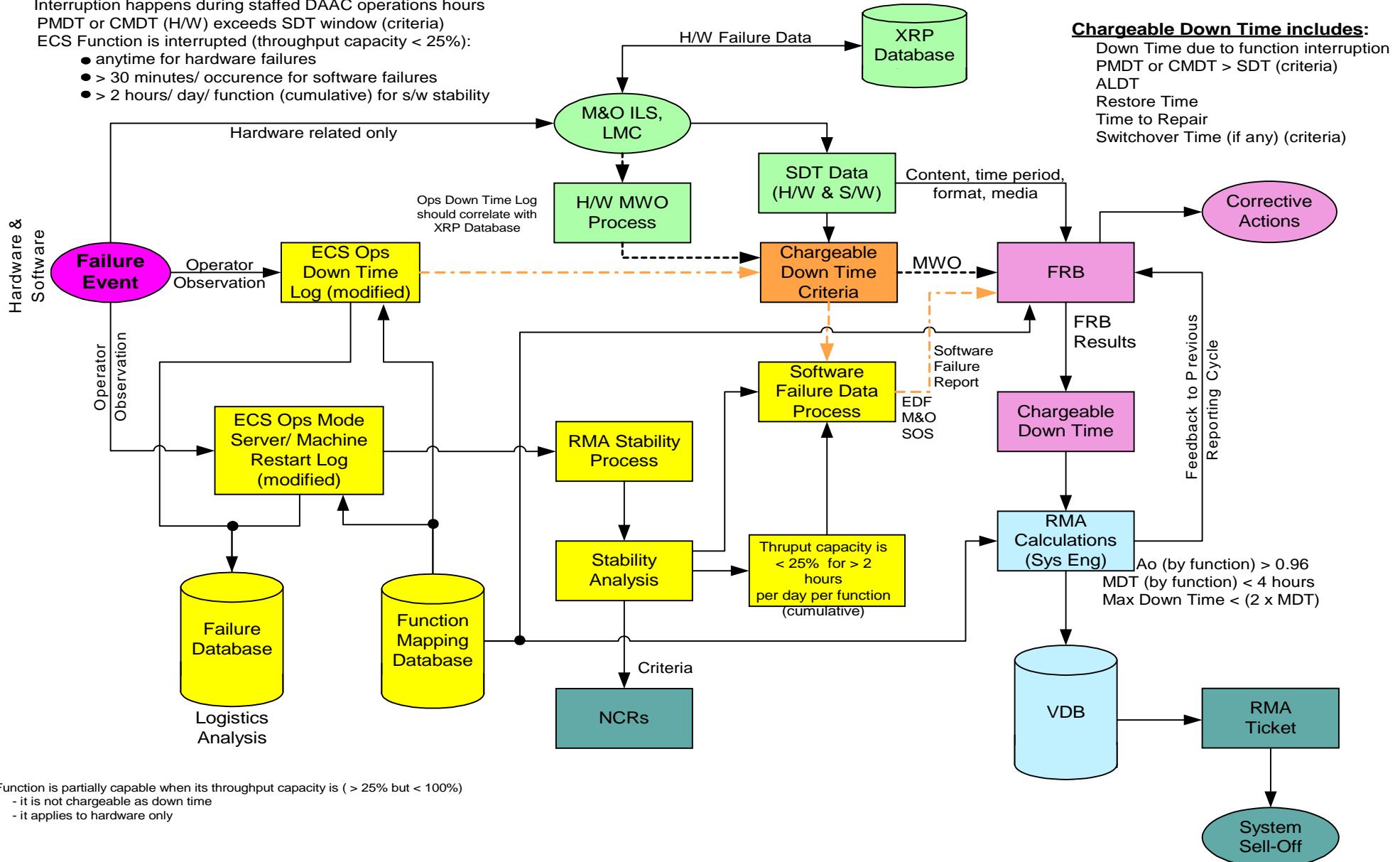


Figure D-1. Failures and RMA Process Flow Chart

# Appendix E: Function Mapping to ECS Hardware & Software

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## Function Mapping to H/W & S/W (5B) at GDAAC

Function	Data Source	Hardware	Custom S/W	COTS S/W
Ingest & Archive	EDOS	g0icg01	EclnReqMgr	
		g0icg01		Ingest Sybase Server
		g0icg01	EclnGran	
		g0icg01	EcDsStIngestFtpServer	
		g0icg01	FtpClient Daemon	
		g0icg01	FtpCopy Daemon	
		g0icg01	EcDsStStagingDiskServer	
		g0icg01	EcDsStStagingMonitorServer	
		g0icg02 (01?)	EclnPolling.EDOS	
		g0drg01	EcDsStArchiveServer	
		AMASS		AMASS
		g0acg01		STMGT Sybase Server
		g0acg01		SDSRV Sybase Server
		g0acs03	EcDsScienceDataServer	
		g0icg01	EclnReqMgr	
		g0icg01	EclnGran0 (except Ocean prods)	
		g0icg01	EclnGran1 (Ocean products)	
		g0icg01		Ingest Sybase Server
MODAPS	MODAPS	g0acg01	EclnPolling.MODAPS	
		g0icg01	EcDsStIngestFtpServer	
		g0icg01	FtpClient Daemon	
		g0icg01	FtpCopy Daemon	
		g0icg01	EcDsStStagingDiskServer	
		g0icg01	EcDsStStagingMonitorServer	
		g0drg01	EcDsStArchiveServer	
		AMASS		AMASS
		g0acg01		STMGT Sybase Server
		g0acg01		SDSRV Sybase Server
		g0acs03	EcDsScienceDataServer	
		g0icg01	EclnReqMgr	
		g0icg01		Ingest Sybase Server
		g0icg01	EclnGran	
X-DAAC	X-DAAC	g0ins01	EclnEmailGWServer	
		g0icg01	EcDsStIngestFtpServer	
		g0icg01	FtpClient Daemon	
		g0icg01	FtpCopy Daemon	
		g0icg01	EcDsStStagingDiskServer	
		g0icg01	EcDsStStagingMonitorServer	
		g0icg02 (01?)	EclnPolling.DDIST	
		g0drg01	EcDsStArchiveServer	
		AMASS		AMASS
		g0acg01		STMGT Sybase Server
		g0acg01		SDSRV Sybase Server
		g0acs03	EcDsScienceDataServer	
		Larry server (public network; non Ebnet)		network interface
		g0acg01	EclnPolling.xxx	
		g0acg01	EcDsStIngestFtpServer	
Ancillary	Ancillary	g0acg01	FtpClient Daemon	
		g0acg01	FtpCopy Daemon	

		g0acg01	EcDsStStagingDiskServer	
		g0acg01	EcDsStStagingMonitorServer	
		g0drg01	EcDsStArchiveServer	
		g0acg01		STMGT Sybase Server
		AMASS		AMASS
		g0acs03	EcDsScienceDataServer	
		g0acg01		SDSRV Sybase Server
		g0icg01		Ingest Sybase Server
		g0icg01	EcInReqMgr	
		g0icg01	EcInGran	
EMOS		g0icg01	EcInReqMgr	
		g0icg01	EcInGran	
		g0icg01		Ingest Sybase Server
		g0icg01	EcDsStIngestFtpServer	
		g0icg01	FtpClient Daemon	
		g0icg01	FtpCopy Daemon	
		g0icg01	EcDsStStagingDiskServer	
		g0icg01	EcDsStStagingMonitorServer	
		g0icg02 (01?)	EcInPolling.EMOS_HIST	
		g0acg01		STMGT Sybase Server
		AMASS		AMASS
		g0acg01		SDSRV Sybase Server
		g0drg01	EcDsStArchiveServer	
		g0acs03	EcDsScienceDataServer	
FDD		g0icg01	EcInReqMgr	
		g0icg01	EcInGran	
		g0icg01		Ingest Sybase Server
		g0icg01	EcDsStIngestFtpServer	
		g0icg01	FtpClient Daemon	
		g0icg01	FtpCopy Daemon	
		g0icg01	EcDsStStagingDiskServer	
		g0icg01	EcDsStStagingMonitorServer	
		g0icg02 (01?)	EcInPolling.FDD	
		g0acg01	EcInPolling.FDD.AQUA	
		AMASS		AMASS
		g0acg01		STMGT Sybase Server
		g0drg01	EcDsStArchiveServer	
		g0acg01		SDSRV Sybase Server
		g0acs03	EcDsScienceDataServer	
DAO		g0icg01	EcInReqMgr	
		g0icg01	EcInGran	
		g0icg01		Ingest Sybase Server
		g0icg01	EcDsStIngestFtpServer	
		g0icg01	FtpClient Daemon	
		g0icg01	FtpCopy Daemon	
		g0icg01	EcDsStStagingDiskServer	
		g0icg01	EcDsStStagingMonitorServer	
		g0acg01	EcInPolling.DAO	
		g0drg01	EcDsStArchiveServer	
		AMASS		AMASS
		g0acg01		STMGT Sybase Server
		g0acg01		SDSRV Sybase Server
		g0acs03	EcDsScienceDataServer	
Production	Production	g0ins02	EcloAdServer	
		g0ins02		IOS Sybase Server
		g0ins01	EcSbSubServer	
		g0ins01		SBSRV Sybase Server
		g0pls01	PRE	
		g0ais05	SSIT Workstation	
		g0spg10	PGE Wrapper, PGEs	
		g0sps06/g0pls02 ?	EcPISubMgr	

			Autosys
	g0pls02		PDPS Sybase Server
	g0sps06/g0pls02 ?	EcDpPrDeletion	
	g0sps06/g0pls02 ?	EcDpPrJobMgmt	
	g0acg01		SDSRV Sybase Server
	g0acs03	EcDsScienceDataServer	
	g0drg01	EcDsStStagingDiskServer	
	g0drg01	EcDsStStagingMonitorServer	
	g0drg01	EcDsStFtpDisServer	
	g0drg01	EcDsStArchiveServer	
	g0drg01	FTPCClient daemons	
	g0drg01	FTPCopy daemons	
	AMASS		AMASS
	g0acg01		STMGT Sybase Server
<b>Fulfillment:</b> Data Distribution and Order Tracking	FTP Push	g0dis02	EcDsDistributionServer
		g0acg01,g0drg01	EcDsStStagingDiskServer
		g0acg01,g0drg01	EcDsStStagingMonitorServer
		g0drg01	EcDsStFtpDisServer (PDPS)
		g0acg01	EcDsStFtpDisServer (others)
		g0drg01	EcDsStArchiveServer
		g0drg01,g0acg01	FTPCClient daemons
		g0drg01,g0acg01	FTPCopy daemons
		AMASS	AMASS
		g0acg01	STMGT Sybase Server
		g0mss21	EcMsAcRegUserSrvr
		g0mss21	EcMsAcOrderSrvr
		g0mss21	MSS Sybase Server
		g0acg01	SDSRV Sybase Server
		g0acs03	EcDsScienceDataServer
		g0dis02	EcDsDistributionServer
8 mm	FTP Pull	g0acg01,g0drg01	EcDsStStagingDiskServer
		g0acg01,g0drg01	EcDsStStagingMonitorServer
		g0drg01	EcDsStFtpDisServer (PDPS)
		g0acg01	EcDsStFtpDisServer (others)
		g0drg01	EcDsStArchiveServer
		g0drg01,g0acg01	FTPCClient daemons
		g0drg01,g0acg01	FTPCopy daemons
		g0dis02	EcDsSt8MMServer
		g0dis02	EcDsStPrintServer
		g0acg01	STMGT Sybase Server
		AMASS	AMASS
		g0mss21	EcMsAcRegUserSrvr
		g0mss21	EcMsAcOrderSrvr
		g0mss21	MSS Sybase Server
		g0acg01	SDSRV Sybase Server

		g0acs03	EcDsScienceDataServer	
<b>PDS</b>	Other Media (DLT, CD-ROM, DVD)	SCLI		
		l0acs03	EcDsScienceDataServer	
				Rimage Power Tools
				Oracle
				PDS
<b>User Reg</b>		g0mss21	EcMsReqUserSrvr	
		g0ins02	EcCIDtUserProfileGateway	
		g0mss21		MSS Sybase Server
<b>Search EDG</b>		g0ins02	EcDmV0ToEcsGateway	
		g0ins02	EcDmDictServer	
		offsite		EDG
		g0ins02		DDICT Sybase Server
		g0acs03	EcDsScienceDataServer	
		g0acg01		SDSRV Sybase Server
<b>Order EDG</b>		g0ins02	EcDmV0ToEcsGateway	
		g0ins02	EcMdDictServer	
		offsite		EDG
		g0ins02		DDICT Sybase Server
		g0acs03	EcDsScienceDataServer	
		g0acg01		SDSRV Sybase Server
<b>Browse EDG</b>		g0ins02	EcDmV0ToEcsGateway	
		g0ins02	EcDmDictServer	
		offsite		EDG
		g0ins02		DDICT Sybase Server
		g0acs03	EcDsScienceDataServer	
		g0acg01		SDSRV Sybase Server
<b>All</b>		g0icg01	EcCsRegistryServer	
		g0icg01		Registry Sybase Server
				DCE,NFS

## Function Mapping to H/W & S/W (5B) at EDC

Function	Data	Hardware	Custom S/W	COTS S/W
Ingest	Landsat-7	e0icq11	EcInReqMgr	
		e0icg11	EcInAuto	
		e0icg11	EcInGran1	
		e0icg11		Ingest Sybase Server
		AMASS		AMASS
		e0acg11		STMGT Sybase Server
		e0ins01	EcCsLandsat7Gateway	
		e0drg11	EcDsStArchiveServer (science)	
		e0acg11	EcDsStArchiveServer (browse)	
		e0icg11	EcDsStIngestFtpServer	
		e0icg11	EcDsStStagingDiskServer	
		e0icg11	EcDsStStagingMonitorServer	
		e0acg11		SDSRV Sybase Server
		e0acs05	EcDsScienceDataServer	
MODAPS	MODAPS	e0icg11	EcInPolling.MODAPS	
		e0icg11	EcInGran	
		e0icg11	EcInReqMgr	
		e0icg11		Ingest Sybase Server
		AMASS		AMASS
		e0acg11		STMGT Sybase Server
		e0drg12	EcDsStArchiveServer	
		e0icg11	EcDsStIngestFtpServer	
		e0icg11	EcDsStStagingDiskServer	
		e0icg11	EcDsStStagingMonitorServer	
		e0acg11		SDSRV Sybase Server
		e0acs05	EcDsScienceDataServer	
X-DAAC	X-DAAC	e0icg11	EcInPolling.DDIST	
		e0icg11	EcInGran	
		e0icg11	EcInReqMgr	
		e0icg11		Ingest Sybase Server
		AMASS		AMASS
		e0acg11		STMGT Sybase Server
		e0drg12	EcDsStArchiveServer	
		e0icg11	EcDsStIngestFtpServer	
		e0icg11	EcDsStStagingDiskServer	
		e0icg11	EcDsStStagingMonitorServer	
		e0acg11		SDSRV Sybase Server
		e0acs05	EcDsScienceDataServer	
ASTER	ASTER	e0dis02	EcDsStD3Server	
		D3 tape drive		
		e0icg11	EcInReqMgr	
		e0icg11		Ingest Sybase Server
		e0icg11	EcInGran0	
		e0icg11	EcDsStIngestFtpServer	
		e0icg11	EcDsStStagingDiskServer	
		e0icg11	EcDsStStagingMonitorServer	
		e0acg11		STMGT Sybase Server
		AMASS		AMASS
		e0acg11		SDSRV Sybase Server
		e0drg12	EcDsStArchiveServer	
L7 CPF	L7 CPF	e0acs05	EcDsScienceDataServer	
		e0icg11	EcInPolling.ias002	
		e0icg11	EcInReqMgr	
		e0icg11		Ingest Sybase Server
		e0icg11	EcInGran1	

		e0icg11	EcDsStIngestFtpServer	
		e0icg11	EcDsStStagingDiskServer	
		e0icg11	EcDsStStagingMonitorServer	
		e0acg11		STMGT Sybase Server
		AMASS		AMASS
		e0acg11		SDSRV Sybase Server
		e0drg11	EcDsStArchiveServer	
		e0acs05	EcDsScienceDataServer	
ASTER polling	ASTER polling	e0icg11	EclnPolling.ASTERDEM	
		e0icg11	EclnPolling.ASTER_OSF	
		e0icg11	EclnPolling.ASTER_GDS	
		e0icg11	EclnReqMgr	
		e0icg11		Ingest Sybase Server
		e0icg11	EclnGran0	
		e0icg11	EcDsStIngestFtpServer	
		e0icg11	EcDsStStagingDiskServer	
		e0icg11	EcDsStStagingMonitorServer	
		e0acg11		STMGT Sybase Server
		AMASS		AMASS
		e0acg11		SDSRV Sybase Server
		e0drg12	EcDsStArchiveServer	
		e0acs05	EcDsScienceDataServer	
Production	Production	e0ins02	EcloAdServer	
		e0ins02		IOS Sybase Server
		e0ins01	EcSbSubServer	
		e0ins01		SBSRV Sybase Server
		e0pls03	PRE	
		e0ais02	SSIT Workstation	
		e0spg01, e0spg05	PGE Wrapper, PGEs	
		e0sps04	EcPISubMgr	
				Autosys
		e0pls02		PDPS Sybase Server
		e0sps04	EcDpPrDeletion	
		e0sps04	EcDpPrJobMgmt	
		e0acg11		SDSRV Sybase Server
		e0acs05	EcDsScienceDataServer	
		e0drg12	EcDsStStagingDiskServer	
		e0drg12	EcDsStStagingMonitorServer	
		e0drg12	EcDsStFtpDisServer	
		e0drg12	EcDsStArchiveServer	
		e0drg12	FTPClient daemons	
		e0drg12	FTPCopy daemons	
		AMASS		AMASS
		e0acg11		STMGT Sybase Server
Fulfillment	FTP Push	e0dis02	EcDsDistributionServer	
		e0drg11	EcDsStStagingDiskServer	
		e0drg11	EcDsStStagingMonitorServer	
		e0drg11	EcDsStFtpDisServer (PDPS)	
		e0acg11	EcDsStFtpDisServer (others)	
		e0drg11	EcDsStArchiveServer (L7)	
		e0drg12	EcDsStArchiveServer	
		e0acg11	EcDsStArchiveServer (Browse)	
		e0drg11,e0acg11	FTPClient daemons	
		e0drg11,e0acg11	FTPCopy daemons	
				AMASS
		e0acg11		STMGT Sybase Server
		e0mss21	EcMsAcRegUserSrvr	
		e0mss21	EcMsAcOrderSrvr	
		e0mss21		MSS Sybase Server
		e0acg11		SDSRV Sybase Server
		e0acs05	EcDsScienceDataServer	

	FTP Pull	e0dis02	EcDsDistributionServer	
		e0drg11	EcDsStStagingDiskServer	
		e0drg11	EcDsStStagingMonitorServer	
		e0drg11	EcDsStFtpDisServer (PDPS)	
		???	EcDsStFtpDisServer (others)	
		e0drg11	FTPCClient daemons	
		e0drg11	FTPCopy daemons	
		e0acg11	EcDsStPullMonitorServer	
		e0drg11	EcDsStArchiveServer (L7)	
		e0drg12	EcDsStArchiveServer	
		e0acg11	EcDsStArchiveServer (Browse)	
			AMASS	
		e0acg11	STMGT Sybase Server	
		e0mss21	EcMsAcRegUserSrvr	
		e0mss21	EcMsAcOrderSrvr	
		e0mss21	MSS Sybase Server	
		e0acs05	EcDsScienceDataServer	
		e0acg11	SDSRV Sybase Server	
	8 mm	e0dis02	EcDsDistributionServer	
		e0drg11	EcDsStStagingDiskServer	
		e0drg11	EcDsStStagingMonitorServer	
		e0drg11	EcDsStFtpDisServer (PDPS)	
		???	EcDsStFtpDisServer (others)	
		e0drg11	EcDsStArchiveServer (L7)	
		e0drg12	EcDsStArchiveServer	
		e0acg11	EcDsStArchiveServer (Browse)	
		e0drg11	FTPCClient daemons	
		e0drg11	FTPCopy daemons	
		e0dis02	EcDsSt8MMServer	
		e0dis02	EcDsStPrintServer	
		e0acg11	STMGT Sybase Server	
			AMASS	
		e0mss21	EcMsAcRegUserSrvr	
		e0mss21	EcMsAcOrderSrvr	
		e0mss21	MSS Sybase Server	
		e0acg11	SDSRV Sybase Server	
		e0acs05	EcDsScienceDataServer	
PDS	Other Media (DLT, CD-ROM, DVD)	SCLI		
		e0acs05	EcDsScienceDataServer	
			Rimage Power Tools	
			Oracle	
		SCLI	PDS	
User Reg		e0mss21	EcMsReqUserSrvr	
		e0ins02	EcCIDtUserProfileGateway	
		e0mss21	MSS Sybase Server	
Search EDG		e0ins02	EcDmV0ToEcsGateway	
		e0ins02	EcDmDictServer	
		e0ins02	EDG	
		e0ins02	DDICT Sybase Server	
		e0acs05	EcDsScienceDataServer	
		e0acg11	SDSRV Sybase Server	
Order EDG		e0ins02	EcDmV0ToEcsGateway	
		e0ins02	EcMdDictServer	
		e0ins02	EDG	
		e0ins02	DDICT Sybase Server	
		e0acs05	EcDsScienceDataServer	
		e0acg11	SDSRV Sybase Server	
Browse		e0ins02	EcDmV0ToEcsGateway	

<b>EDG</b>	e0ins02	<u>EcDmDictServer</u>	
	e0ins02		EDG
	e0ins02		DDICT Sybase Server
	e0acs05	<u>EcDsScienceDataServer</u>	
	e0acg11		SDSRV Sybase Server
<b>All</b>	e0icg11	<u>EcCsRegistryServer</u>	
	e0icg11		Registry Sybase Server
			DCE,NFS
<b>Order L7</b>	e0ins02	<u>EcDmV0ToEcsGateway</u>	
	e0ins02	<u>EcDmDictServer</u>	
	e0ins02	<u>EcDmLimServer</u>	
	e0ins02	<u>EcDmEcsToV0Gateway</u>	
	e0wkg02	<u>EcDsHdfEosServer</u>	
	e0ins02		EDG
	e0ins02		DDICT Sybase Server
	e0acg11		SDSRV Sybase Server
			DORRAN
	e0acs05	<u>EcDsScienceDataServer</u>	
<b>JDT</b>	e0ins02	<u>EcClJdt</u>	
	e0ins01	<u>EcCsMojoGateway</u>	

## Function Mapping to H/W & S/W (5B) at LDAAC

Function	Data Source	Hardware	Custom S/W	COTS S/W
Ingest & Archive	EDOS EDOS-ANC	I0icg01	EclnReqMgr	
		I0icg01		Ingest Sybase Server
		I0icg01	EclnGran	
		I0icg01	EcDsStIngestFtpServer	
		I0icg01	FtpClient Daemon	
		I0icg01	FtpCopy Daemon	
		I0icg01	EcDsStStagingDiskServer	
		I0icg01	EcDsStStagingMonitorServer	
		I0icg01	EclnPolling.EDOS	
		I0icg01	EclnPolling.EDOS-ANC	
		I0drg01	EcDsStArchiveServer	
		AMASS		AMASS
		I0acg02		STMGT Sybase Server
		I0acg02		SDSRV Sybase Server
		I0acs03	EcDsScienceDataServer	
		??	EclnEmailGWServer	
X-DAAC	X-DAAC	I0icg01	EclnReqMgr	
		I0icg01	EclnGran	
		I0icg01		Ingest Sybase Server
		I0icg01	EcDsStIngestFtpServer	
		I0icg01	FtpClient Daemon	
		I0icg01	FtpCopy Daemon	
		I0icg01	EcDsStStagingDiskServer	
		I0icg01	EcDsStStagingMonitorServer	
		I0ins01	EclnPolling.DDIST	
		I0drg01	EcDsStArchiveServer	
		AMASS		AMASS
		I0acg02		STMGT Sybase Server
		I0acg02		SDSRV Sybase Server
		I0acs03	EcDsScienceDataServer	
		I0icg01	EclnReqMgr	
MOPITT	MOPITT	I0icg01		Ingest Sybase Server
		I0icg01	EclnGran	
		I0icg01	EcDsStIngestFtpServer	
		I0icg01	FtpClient Daemon	
		I0icg01	FtpCopy Daemon	
		I0icg01	EcDsStStagingDiskServer	
		I0icg01	EcDsStStagingMonitorServer	
		I0acg02	EclnPolling.MOPITT	
		I0drg01	EcDsStArchiveServer	
		AMASS		AMASS
		I0acg02		STMGT Sybase Server
		I0acg02		SDSRV Sybase Server
		I0acs03	EcDsScienceDataServer	
		I0icg01	EclnReqMgr	
ACRIM	ACRIM	I0icg01		Ingest Sybase Server
		I0icg01	EclnGran	
		I0icg01	EcDsStIngestFtpServer	
		I0icg01	FtpClient Daemon	
		I0icg01	FtpCopy Daemon	
		I0icg01	EcDsStStagingDiskServer	
		I0icg01	EcDsStStagingMonitorServer	
		I0acg02	EclnPolling.ACRIM	
		I0drg01	EcDsStArchiveServer	
		AMASS		AMASS

	I0acg02		STMGT Sybase Server
	I0acg02		SDSRV Sybase Server
	I0acs03	EcDsScienceDataServer	
EMOS	I0icg01	EclnReqMgr	
	I0icg01	EclnGran	
	I0icg01		Ingest Sybase Server
	I0icg01	EcDsStIngestFtpServer	
	I0icg01	FtpClient Daemon	
	I0icg01	FtpCopy Daemon	
	I0icg01	EcDsStStagingDiskServer	
	I0icg01	EcDsStStagingMonitorServer	
	I0icg01	EclnPolling.EMOS	
	g0acg02		STMGT Sybase Server
	AMASS		AMASS
	I0acg02		SDSRV Sybase Server
FDD / FDS	I0icg01	EclnReqMgr	
	I0icg01	EclnGran	
	I0icg01		Ingest Sybase Server
	I0icg01	EcDsStIngestFtpServer	
	I0icg01	FtpClient Daemon	
	I0icg01	FtpCopy Daemon	
	I0icg01	EcDsStStagingDiskServer	
	I0icg01	EcDsStStagingMonitorServer	
	I0icg01	EclnPolling.FDD	
	AMASS		AMASS
	I0acg02		STMGT Sybase Server
	I0drg01	EcDsStArchiveServer	
Production	I0acg02		SDSRV Sybase Server
	I0acs03	EcDsScienceDataServer	
Production	I0ins02	EcloAdServer	
	I0ins02		IOS Sybase Server
	I0ins01	EcSbSubServer	
	I0ins01		SBSRV Sybase Server
	I0pls02	PRE	
	I0ais10	SSIT Workstation	
	I0spg01,	PGE Wrapper, PGEs	
	I0sp03	EcPISubMgr	
	I0sp03		Autosys
	I0pls02		PDPS Sybase Server
	I0sp03	EcDpPrDeletion	
	I0sp03	EcDpPrJobMgmt	
	I0acg02		SDSRV Sybase Server
	I0acs03	EcDsScienceDataServer	
	I0drg01	EcDsStStagingDiskServer	
	I0drg01	EcDsStStagingMonitorServer	
	I0drg01	EcDsStFtpDisServer	
	I0drg01	EcDsStArchiveServer	
Fulfillment Data Distribution and Order Tracking	I0drg01	FTPClient daemons	
	I0drg01	FTPCopy daemons	
	AMASS		AMASS
	I0acg02		STMGT Sybase Server
FTP Push	I0dis02	EcDsDistributionServer	
	I0drg01	EcDsStStagingDiskServer	
	I0drg01	EcDsStStagingMonitorServer	
	I0drg01	EcDsStFtpDisServer (PDPS)	
	I0acg02	EcDsStFtpDisServer (others)	
	I0drg01	EcDsStArchiveServer	
	I0drg01,I0acg0	FTPClient daemons	
	I0drg01,I0acg0	FTPCopy daemons	

	AMASS	AMASS	
	I0acg02	STMGT Sybase Server	
	I0mss21	EcMsAcRegUserSrvr	
	I0mss21	EcMsAcOrderSrvr	
	I0mss21	MSS Sybase Server	
	I0acg02	SDSRV Sybase Server	
	I0acs03	EcDsScienceDataServer	
FTP Pull	I0dis02	EcDsDistributionServer	
	I0drg01	EcDsStStagingDiskServer	
	I0drg01	EcDsStStagingMonitorServer	
	I0drg01	EcDsStFtpDisServer (PDPS)	
	???	EcDsStFtpDisServer (others)	
	I0drg01	EcDsStArchiveServer	
	I0drg01	FTPClient daemons	
	I0drg01	FTPCopy daemons	
	I0acg02	EcDsStPullMonitorServer	
		AMASS	
	I0acg02	STMGT Sybase Server	
	I0mss21	EcMsAcRegUserSrvr	
	I0mss21	EcMsAcOrderSrvr	
	I0mss21	MSS Sybase Server	
	I0acs03	EcDsScienceDataServer	
	I0acg02	SDSRV Sybase Server	
8 mm	I0dis02	EcDsDistributionServer	
	I0drg01	EcDsStStagingDiskServer	
	I0drg01	EcDsStStagingMonitorServer	
	I0drg01	EcDsStFtpDisServer (PDPS)	
	???	EcDsStFtpDisServer (others)	
	I0drg01	EcDsStArchiveServer	
	I0drg01	FTPClient daemons	
	I0drg01	FTPCopy daemons	
	I0dis02	EcDsSt8MMSServer	
	I0dis02	EcDsStPrintServer	
	I0acg02	STMGT Sybase Server	
		AMASS	
	I0mss21	EcMsAcRegUserSrvr	
	I0mss21	EcMsAcOrderSrvr	
	I0mss21	MSS Sybase Server	
PDS	I0acg02	SDSRV Sybase Server	
	I0acs03	EcDsScienceDataServer	
		Rimage Power Tools	
		Oracle	
		PDS	
User Reg	I0mss21	EcMsReqUserSrvr	
	I0ins02	EcCIDtUserProfileGateway	
	I0mss21	MSS Sybase Server	
Search EDG	I0ins02	EcDmV0ToEcsGateway	
	I0ins02	EcDmDictServer	
	offsite	EDG	
	I0ins02	DDICT Sybase Server	
	I0acs03	EcDsScienceDataServer	
	I0acg02	SDSRV Sybase Server	
Order EDG	I0ins02	EcDmV0ToEcsGateway	
	I0ins02	EcMdDictServer	
	offsite	EDG	
	I0ins02	DDICT Sybase Server	
	I0acs03	EcDsScienceDataServer	
	I0acg02	SDSRV Sybase Server	

<b>Browse EDG</b>	I0ins02	EcDmV0ToEcsGateway	
	I0ins02	EcDmDictServer	
	offsite		EDG
	I0ins02		DDICT Sybase Server
	I0acs03	EcDsScienceDataServer	
	I0acg02		SDSRV Sybase Server
<b>All</b>	I0icg01	EcCsRegistryServer	
	I0icg01		Registry Sybase Server
			DCE,NFS

## Function Mapping to H/W & S/W (5B) at NSIDC

Function	Data	Hardware	Custom S/W	COTS S/W
Ingest	MODAPS			
	Ancillary			
Production	N/A			
Fulfillment	FTP Push	n0dis02	EcDsDistributionServer	
		n0drg01	EcDsStStagingDiskServer	
		n0drg01	EcDsStStagingMonitorServer	
		n0acg01	EcDsStFtpDisServer	
		n0drg01	EcDsStArchiveServer	
		n0drg01,n0acg01	FTPCClient daemons	
		n0drg01,n0acg01	FTPCopy daemons	
				AMASS
		n0acg01		STMGT Sybase Server
		n0mss21	EcMsAcRegUserSrvr	
		n0mss21	EcMsAcOrderSrvr	
		n0mss21		MSS Sybase Server
		n0acg01		SDSRV Sybase Server
	FTP Pull	n0acs04	EcDsScienceDataServer	
		n0dis02	EcDsDistributionServer	
		n0drg01	EcDsStStagingDiskServer	
		n0drg01	EcDsStStagingMonitorServer	
		???	EcDsStFtpDisServer	
		n0drg01	EcDsStArchiveServer	
		n0drg01	FTPCClient daemons	
		n0drg01	FTPCopy daemons	
		n0acg01	EcDsStPullMonitorServer	
				AMASS
		n0acg01		STMGT Sybase Server
		n0mss21	EcMsAcRegUserSrvr	
		n0mss21	EcMsAcOrderSrvr	
		n0mss21		MSS Sybase Server
		n0acs04	EcDsScienceDataServer	
		n0acg01		SDSRV Sybase Server
8 mm	8 mm	n0dis02	EcDsDistributionServer	
		n0drg01	EcDsStStagingDiskServer	
		n0drg01	EcDsStStagingMonitorServer	
		???	EcDsStFtpDisServer	
		n0drg01	EcDsStArchiveServer	
		n0drg01	FTPCClient daemons	
		n0drg01	FTPCopy daemons	
		n0dis02	EcDsSt8MMServer	
		n0dis02	EcDsStPrintServer	
		n0acg01		STMGT Sybase Server
				AMASS
		n0mss21	EcMsAcRegUserSrvr	
		n0mss21	EcMsAcOrderSrvr	
		n0mss21		MSS Sybase Server
		n0acg01		SDSRV Sybase Server
		n0acs04	EcDsScienceDataServer	
PDS	Other Media (DLT, CD-ROM, DVD)	SCLI		
		n0acs04	EcDsScienceDataServer	
				Rimage Power Tools
				Oracle

				PDS
<b>User Reg</b>		n0mss21	EcMsReqUserSrvr	
		n0ins02	EcCIDtUserProfileGateway	
		n0mss21		MSS Sybase Server
<b>Search EDG</b>		n0ins02	EcDmV0ToEcsGateway	
		n0ins02	EcDmDictServer	
				EDG
		n0ins02		DDICT Sybase Server
		n0acs04	EcDsScienceDataServer	
<b>Order EDG</b>		n0acg01		SDSRV Sybase Server
		n0ins02	EcDmV0ToEcsGateway	
		n0ins02	EcMdDictServer	
				EDG
		n0ins02		DDICT Sybase Server
<b>Browse EDG</b>		n0acs04	EcDsScienceDataServer	
		n0acg01		SDSRV Sybase Server
		n0ins02	EcDmV0ToEcsGateway	
		n0ins02	EcDmDictServer	
				EDG
<b>All</b>		n0ins02	EcDmV0ToEcsGateway	
		n0acs04	EcDsScienceDataServer	
		n0acg01		SDSRV Sybase Server
		n0icq02	EcCsRegistryServer	
		n0icq02		Registry Sybase Server
				DCE,NFS

## Functions Mapping to H/W & S/W (5B) at SMC

Function	Data	Hardware	Custom S/W	COTS S/W
Ingest				
Fulfillment	FTP Push			
	FTP Pull			
	8 mm			
	DLT			
	CD-ROM			
User Reg		m0mss16	EcMsAcRegUserSrvr	Sybase Replication Server
		m0css03	EcCIUserRegistration / WbUr	EDG (?)
		m0mss16		MSS Sybase Server
Search (from ASTER GDS)		m0mss15	EcDmAsterToEcsGateway	
		m0mss15	EcDmDictService	
		m0mss15		DDICT Sybase Server
Order (from ASTER GDS)		m0mss15	EcDmAsterToEcsGateway	
		m0mss15	EcDmDictService	
		m0mss15		DDICT Sybase Server
		m0mss16		MSS Sybase server
				Sybase replication server
All		m0mss16	EcMsOrderSrvr	
Browse		m0mss16	EcCsRegistry	Registry Sybase Server

## Functions Mapping to H/W & S/W (6A) at GDAAC

Function	Data Source	Hardware	Custom S/W	COTS S/W
Ingest & Archive	EDOS	g0icg01	EclnReqMgr	
		g0icg01		Ingest Sybase Server
		g0icg01	EclnGran	
		g0icg01	EcDsStFtpServer	
		g0icg01	EcDsStStagingDiskServer	
		g0drg01	EcDsStCacheManagerServer	
		g0dis02	EcDsStRequestManagerServer	
		g0drg01	EcDsStArchiveServer	
		g0icg02(01?)	EclnPolling.EDOS	
		g0acg01		STMGT Sybase Server
				AMASS
		g0acg01		SDSRV Sybase Server
	g0acs03		EcDsScienceDataServer	
	MODAPS	g0icg01	EclnReqMgr	
		g0icg01	EclnGran0 (except Ocean prods)	
		g0icg01	EclnGran1 (Ocean products)	
		g0icg01	EcDsStFtpServer	
		g0icg01	EcDsStStagingDiskServer	
		g0drg01	EcDsStCacheManagerServer	
		g0dis02	EcDsStRequestManagerServer	
		g0drg01	EcDsStArchiveServer	
		g0acg01	EclnPolling.MODAPS	
		g0icg01		Ingest Sybase Server
		g0acg01		STMGT Sybase Server
				AMASS
	g0acs03		EcDsScienceDataServer	
	g0acg01			SDSRV Sybase Server
EMOS	EMOS	g0icg01	EclnReqMgr	
		g0icg01		Ingest Sybase Server
		g0icg01	EclnGran	
		g0icg01	EcDsStFtpServer	
		g0icg01	EcDsStStagingDiskServer	
		g0drg01	EcDsStCacheManagerServer	
		g0dis02	EcDsStRequestManagerServer	
		g0drg01	EcDsStArchiveServer	
		g0icg02(01?)	EclnPolling.EMOS_HIST	
		g0acg01		STMGT Sybase Server
				AMASS
		g0acg01		SDSRV Sybase Server
	g0acs03		EcDsScienceDataServer	
	Ancillary	Larry server (public network; non Ebnet)		network interface
		g0icg01	EclnReqMgr	
		g0icg01	EclnGran	
		g0acg05	EclnPolling.xxx	
		g0acg05	EcDsStFtpServer	
		g0acg05	EcDsStStagingDiskServer	
		g0drg01	EcDsStCacheManagerServer	
		g0drg01	EcDsStArchiveServer	
		g0dis02	EcDsStRequestManagerServer	
		g0icg01		Ingest Sybase Server
		g0acg01		STMGT Sybase Server
				AMASS
	g0acs03		EcDsScienceDataServer	
	g0acg01			SDSRV Sybase Server

XDAAC			
	g0icg01	EcInReqMgr	
	g0icg01		Ingest Sybase Server
	g0icg01	EcInGran	
	g0icg01	EcDsStFtpServer	
	g0icg01	EcDsStStagingDiskServer	
	g0drg01	EcDsStCacheManagerServer	
	g0dis02	EcDsStRequestManagerServer	
	g0drg01	EcDsStArchiveServer	
	g0ins01	EcInEmailGWServer	
	g0icg02(01?)	EcInPolling.DDIST	
	g0acg01		STMGT Sybase Server
			AMASS
	g0acg01		SDSRV Sybase Server
	g0acs03	EcDsScienceDataServer	
FDD FDD.AQUA	g0icg01	EcInReqMgr	
	g0icg01		Ingest Sybase Server
	g0icg01	EcInGran	
	g0icg01	EcDsStFtpServer	
	g0icg01	EcDsStStagingDiskServer	
	g0drg01	EcDsStCacheManagerServer	
	g0dis02	EcDsStRequestManagerServer	
	g0drg01	EcDsStArchiveServer	
	g0icg02(01?)	EcInPolling.FDD	
	g0acg01	EcInPolling.FDD.AQUA	
	g0acg01		STMGT Sybase Server
			AMASS
	g0acg01		SDSRV Sybase Server
	g0acs03	EcDsScienceDataServer	
DAO	g0icg01	EcInReqMgr	
	g0icg01		Ingest Sybase Server
	g0icg01	EcInGran	
	g0icg01	EcDsStFtpServer	
	g0icg01	EcDsStStagingDiskServer	
	g0drg01	EcDsStCacheManagerServer	
	g0dis02	EcDsStRequestManagerServer	
	g0drg01	EcDsStArchiveServer	
	g0acg01	EcInPolling.DAO	
	g0acg01		STMGT Sybase Server
			AMASS
	g0acg01		SDSRV Sybase Server
	g0acs03	EcDsScienceDataServer	
Production	Production	g0ins02	EcloAdServer
		g0ins02	Adv. Sybase Server
		g0ins01	EcSbSubServer
		g0ins01	SBSRV Sybase Server
		g0pls01	PRE
		g0ais05	SSIT Workstation
		g0spg10,g0spg07	PGE Wrappers, PGEs
		g0pls02/g0sps06 ??	EcPISubMgr
			Autosys
		g0pls02	PDPS Sybase Server
		g0pls02/g0sps04 ??	EcDpPrDeletion
		g0pls02/g0sps04 ??	EcDpPrJobMgmt
		g0drg01	EcDsStStagingDiskServer
		g0drg01	EcDsStCacheManagerServer
		g0dis02	EcDsStRequestManagerServer
		g0drg01	EcDsStFtpServer
		g0drg01	EcDsStArchiveServer
		g0acg01	STMGT Sybase Server

				AMASS
		g0acg01		SDSRV Sybase Server
		g0acs03	EcDsScienceDataServer	
<b>Fulfillment</b>	FTP Push	g0dis02	EcDsDistributionServer	
		g0drg01	EcDsStStagingDiskServer	
		g0drg01	EcDsStCacheManagerServer	
		g0dis02	EcDsStRequestManagerServer	
		g0drg01	EcDsStFtpServer (PDPS)	
		g0acg05	EcDsStFtpServer (all others)	
		g0drg01	EcDsStArchiveServer	
		g0acg01		STMGT Sybase Server
		g0mss21	EcMsAcRegUserSrvr	AMASS
		g0mss21	EcMsAcOrderSrvr	
	FTP Pull	g0mss21		MSS Sybase Server
		g0acg01		SDSRV Sybase Server
		g0acs03	EcDsScienceDataServer	
		g0dis02	EcDsDistributionServer	
		g0drg01	EcDsStStagingDiskServer	
		g0dis02	EcDsStRequestManagerServer	
		g0drg01	EcDsStFtpServer (PDPS)	
		g0acg05	EcDsStFtpServer (all others)	
<b>PDS</b>	8 mm	g0drg01	EcDsStArchiveServer	
		g0acg05	EcDsStPullMonitorServer (aka CacheManagerServer)	
		g0acg01		STMGT Sybase Server
		g0mss21	EcMsAcRegUserSrvr	AMASS
		g0mss21	EcMsAcOrderSrvr	
	DLT	g0mss21		MSS Sybase Server
		g0acs03	EcDsScienceDataServer	
		g0acg01		SDSRV Sybase Server
			SCLI	
			EcDsScienceDataServer	Rimage Power Tools
	CD-ROM			Oracle
				PDS
			SCLI	
		g0acs03	EcDsScienceDataServer	
				Rimage Power Tools
<b>User Reg</b>	DVD			PDS
			SCLI	
		g0acs03	EcDsScienceDataServer	
				Oracle
				Rimage Power Tools
	User Reg			PDS
		g0mss21	EcMsReqUserSrvr	
		g0ins01	EcCsDtUserProfileGateway	
		g0mss21		MSS Sybase Server
		offsite		EDG
<b>Search MTMGW</b>		g0ins01	EcCsMtMGateway	
		g0acs03	EcDsScienceDataServer	
				ssh
<b>Order MTMGW</b>		g0ins01	EcCsMtMGateway	
		g0acs03	EcDsScienceDataServer	

	g0acg01		SDSRV Sybase Server
<b>Search EDG</b>	g0ins02	EcDmV0ToEcsGateway	
	g0ins02	EcDmDictServer	
	g0ins02		DDICT Sybase Server
	offsite		EDG
	g0acg01		SDSRV Sybase Server
	g0acs03	EcDsScienceDataServer	
<b>Order EDG</b>	g0ins02	EcDmV0ToEcsGateway	
	g0ins02	EcDmDictServer	
	g0ins02		DDICT Sybase Server
	offsite		EDG
	g0acg01		SDSRV Sybase Server
	g0acs03	EcDsScienceDataServer	
<b>Browse EDG</b>	g0ins02	EcDmV0ToEcsGateway	
	g0ins02	EcDmDictServer	
	g0ins02		DDICT Sybase Server
	offsite		EDG
	g0acg01		SDSRV Sybase Server
	g0acs03	EcDsScienceDataServer	
<b>All</b>	g0icg01	EcCsRegistryServer	
	g0icg01		Registry Sybase Server
			DCE,NFS

## Functions Mapping to H/W & S/W (6A) at EDC

Function	Data Source	Hardware	Custom S/W	COTS S/W
Ingest & Archive	Landsat-7	e0icg11	EcInRegMgr	
		e0icg11	EcInAuto	
		e0icg11	EcInGran1	
		e0ing11		Ingest Sybase Server
		e0ins01	EcCsLandsat7Gateway	
		e0drg11(science)	EcDsStArchiveServer	
		e0acg11 (browse)	EcDsStArchiveServer	
		e0icg11	EcDsStFtpServer	
		e0icg11	EcDsStStagingDiskServer	
		e0drg11 (science)	EcDsStCacheManager	
		e0acg11 (browse)	EcDsStCacheManager	
		e0dis01	EcDsStRequestManager	
				AMASS
		e0acg11		STMGT Sybase Server
		e0acg11		SDSRV Sybase Server
		e0acs05	EcDsScienceDataServer	
ASTER	ASTER	e0dis02	EcDsStD3Server	
		D3 tape drive		
		e0icg11	EcInRegMgr	
		e0icg11	EcInGran0	
				Ingest Sybase Server
		e0drg12	EcDsStArchiveServer	
		e0icg11	EcDsStFtpServer	
		e0icg11	EcDsStStagingDiskServer	
		e0drg12	EcDsStCacheManager	
		e0dis01	EcDsStRequestManager	
				AMASS
		e0acg11		STMGT Sybase Server
		e0acg11		SDSRV Sybase Server
		e0acs05	EcDsScienceDataServer	
MODAPS	MODAPS	e0icg11	EcInPolling.MODAPS	
		e0icg11	EcInGran	
		e0icg11	EcInRegMgr	
		e0icg11		Ingest Sybase Server
		AMASS		AMASS
		e0acg11		STMGT Sybase Server
		e0drg12	EcDsStArchiveServer	
		e0icg11	EcDsStFtpServer	
		e0icg11	EcDsStStagingDiskServer	
		e0drg12	EcDsStCacheManager	
		e0dis01	EcDsStRequestManager	
		e0acg11		SDSRV Sybase Server
		e0acs05	EcDsScienceDataServer	
XDAAC	XDAAC	e0icg11	EcInPolling.DDIST	
		e0icg11	EcInGran	
		e0icg11	EcInRegMgr	
		e0ins02	EcInEmailGWServer	
		e0icg11		Ingest Sybase Server
		AMASS		AMASS
		e0acg11		STMGT Sybase Server
		e0drg12	EcDsStArchiveServer	
		e0icg11	EcDsStFtpServer	
		e0icg11	EcDsStStagingDiskServer	
		e0drg12	EcDsStCacheManager	

		e0dis01	EcDsStRequestManager	
		e0acg11		SDSRV Sybase Server
		e0acs05	EcDsScienceDataServer	
L7 CPF	ASTER Polling	e0icg11	EcInRegMgr	
		e0icg11	EcInGran1	
				Ingest Sybase Server
		e0icg11	EcInPolling.ias002	
		AMASS		AMASS
		e0acg11		STMGT Sybase Server
		e0drg11	EcDsStArchiveServer	
		e0icg11	EcDsStFtpServer	
		e0icg11	EcDsStStagingDiskServer	
		e0drg11	EcDsStCacheManager	
Production	Production	e0dis01	EcDsStRequestManager	
		e0acg11		SDSRV Sybase Server
		e0acs05	EcDsScienceDataServer	
		e0icg11	EcInRegMgr	
		e0icg11	EcInGran0	
				Ingest Sybase Server
		e0icg11	EcInPolling.ASTERDEM	
		e0icg11	EcInPolling.ASTER_GDS	
		e0icg11	EcInPolling.ASTER_OSF	
		AMASS		AMASS
Fulfillment	FTP Push	e0acg11		STMGT Sybase Server
		e0drg12	EcDsStArchiveServer	
		e0icg11	EcDsStFtpServer	
		e0icg11	EcDsStStagingDiskServer	
		e0drg12	EcDsStCacheManager	
		e0dis01	EcDsStRequestManager	
		e0acg11		SDSRV Sybase Server
		e0acs05	EcDsScienceDataServer	
		e0ins02	EcloAdServer	
		e0ins02		Adv. Sybase Server

	e0acg11		STMGT Sybase Server
			AMASS
	e0mss21	EcMsAcRegUserSrvr	
	e0mss21	EcMsAcOrderSrvr	
	e0mss21		MSS Sybase Server
	e0acg11		SDSRV Sybase Server
	e0acs05	EcDsScienceDataServer	
PDS	FTP Pull	e0dis02	EcDsDistributionServer
		e0drg11	EcDsStStagingDiskServer
		e0dis02	EcDsStRequestManagerServer
		e0drg11	EcDsStFtpServer (PDPS)
		???	EcDsStFtpServer (all others)
		e0drg12	EcDsStArchiveServer (ASTER, MODIS)
		e0drg11	EcDsStArchiveServer (L7)
		e0acg11	EcDsStArchiveServer (browse)
		e0acg11	EcDsStPullMonitorServer (aka CacheManagerServer)
		e0acg11	STMGT Sybase Server
			AMASS
		e0mss21	EcMsAcRegUserSrvr
		e0mss21	EcMsAcOrderSrvr
		e0mss21	MSS Sybase Server
		e0acs05	EcDsScienceDataServer
		e0acg11	SDSRV Sybase Server
PDS	8 mm		SCLI
		e0acs05	EcDsScienceDataServer
			Rimage Power Tools
			Oracle
			PDS
	DLT		SCLI
		e0acs05	EcDsScienceDataServer
			Rimage Power Tools
			PDS
			Oracle
	CD-ROM		SCLI
		e0acs05	EcDsScienceDataServer
			Rimage Power Tools
			PDS
			Oracle
	DVD		SCLI
		e0acs05	EcDsScienceDataServer
			Oracle
			Rimage Power Tools
			PDS
User Reg		e0mss21	EcMsReqUserSrvr
		e0ins02	EcCsDtUserProfileGateway
		e0mss21	MSS Sybase Server
		e0ins02	EDG
Search MTMGW		e0ins01	EcCsMtMGateway
		e0acs05	EcDsScienceDataServer
			ssh
Order MTMGW		e0ins01	EcCsMtMGateway
		e0acs05	EcDsScienceDataServer
			ssh
		e0acg11	SDSRV Sybase Server
Search EDG		e0ins02	EcDmV0ToEcsGateway
		e0ins02	EcDmDictServer
		e0ins02	DDICT Sybase Server
		e0ins02	EDG
		e0acg11	SDSRV Sybase Server
		e0acs05	EcDsScienceDataServer
Order		e0ins02	EcDmV0ToEcsGateway

<b>L7</b>	e0ins02	EcDmDictServer	
			DORRAN
	e0ins02		DDICT Sybase Server
	e0ins02		EDG
	e0wkg02	EcDsHdfEosServer	
	e0acg11		SDSRV Sybase Server
	e0acs05	EcDsScienceDataServer	
<b>Browse</b>	e0ins02	EcDmV0ToEcsGateway	
	e0ins02	EcDmDictServer	
	e0acg11		SDSRV Sybase Server
	e0acs05	EcDsScienceDataServer	
<b>JDT</b>	e0ins01	EcCsMojoGateway	
	e0ins02	JDT	
<b>All</b>	e0icq11	EcCsRegistryServer	
			NFS
			DCE

## Functions Mapping to H/W & S/W (6A) at LDAAC

Function	Data Source	Hardware	Custom S/W	COTS S/W
Ingest & Archive	EDOS EDOS-ANC	I0icg01	EcInReqMgr	
		I0icg01		Ingest Sybase Server
		I0icg01	EcInGran	
		I0icg01	EcDsStFtpServer	
		I0icg01	EcDsStStagingDiskServer	
		I0drg01	EcDsStCacheManagerServer	
		I0dis02	EcDsStRequestManagerServer	
		I0drg01	EcDsStArchiveServer	
		I0icg02(01?)	EcInPolling.EDOS	
		I0icg01	EcInPolling.EDOS-ANC	
		I0acg02		STMGT Sybase Server
				AMASS
		I0acg02		SDSRV Sybase Server
	X-DAAC	I0acs03	EcDsScienceDataServer	
		I0icg01	EcInReqMgr	
		I0icg01		Ingest Sybase Server
		I0icg01	EcInGran	
		I0icg01	EcDsStFtpServer	
		I0icg01	EcDsStStagingDiskServer	
		I0drg01	EcDsStCacheManagerServer	
		I0dis02	EcDsStRequestManagerServer	
		I0drg01	EcDsStArchiveServer	
		I0ins01	EcInPolling.DDIST	
		??	EcInEmailGWServer	
		I0acg02		STMGT Sybase Server
	MOPITT			AMASS
		I0acg02		SDSRV Sybase Server
		I0acs03	EcDsScienceDataServer	
		I0icg01	EcInReqMgr	
		I0icg01		Ingest Sybase Server
		I0icg01	EcInGran	
		I0icg01	EcDsStFtpServer	
		I0icg01	EcDsStStagingDiskServer	
		I0drg01	EcDsStCacheManagerServer	
		I0dis02	EcDsStRequestManagerServer	
		I0drg01	EcDsStArchiveServer	
		I0acg02	EcInPolling.MOPITT	
	ACRIM	I0acg02		STMGT Sybase Server
				AMASS
		I0acs03	EcDsScienceDataServer	
		I0acg02		SDSRV Sybase Server
		I0icg01	EcInReqMgr	
		I0icg01		Ingest Sybase Server
		I0icg01	EcInGran	
		I0icg01	EcDsStFtpServer	
		I0icg01	EcDsStStagingDiskServer	
		I0drg01	EcDsStCacheManagerServer	
		I0dis02	EcDsStRequestManagerServer	
		I0drg01	EcDsStArchiveServer	
	EMOS	I0acg02	EcInPolling.ACRIM	
		I0acg02		STMGT Sybase Server
				AMASS
		I0acs03	EcDsScienceDataServer	
		I0acg02		SDSRV Sybase Server
		I0icg01	EcInReqMgr	

	I0icg01		Ingest Sybase Server
	I0icg01	EcInGran	
	I0icg01	EcDsStFtpServer	
	I0icg01	EcDsStStagingDiskServer	
	I0drg01	EcDsStCacheManagerServer	
	I0dis02	EcDsStRequestManagerServer	
	I0drg01	EcDsStArchiveServer	
	I0icg01	EcInPolling.EMOS	
	I0acg02		STMGT Sybase Server
			AMASS
	I0acs03	EcDsScienceDataServer	
	I0acg02		SDSRV Sybase Server
FDD	I0icg01	EcInReqMgr	
	I0icg01		Ingest Sybase Server
	I0icg01	EcInGran	
	I0icg01	EcDsStFtpServer	
	I0icg01	EcDsStStagingDiskServer	
	I0drg01	EcDsStCacheManagerServer	
	I0dis02	EcDsStRequestManagerServer	
	I0drg01	EcDsStArchiveServer	
	I0icg01	EcInPolling.FDD	
	I0acg02		STMGT Sybase Server
			AMASS
	I0acs03	EcDsScienceDataServer	
	I0acg02		SDSRV Sybase Server
Production	Production	I0ins02	EcloAdServer
		I0ins02	Adv. Sybase Server
		I0ins01	EcSbSubServer
		I0ins01	SBSRV Sybase Server
		I0pls02	PRE
		I0ais10	SSIT Workstation
		I0spg01,I0spg0	PGE Wrappers, PGEs
		I0sps03	EcPlSubMgr
			Autosys
		I0pls01	PDPS Sybase Server
		I0sps03	EcDpPrDeletion
		I0sps03	EcDpPrJobMgmt
		I0drg01	EcDsStStagingDiskServer
		I0drg01	EcDsStCacheManagerServer
		I0dis02	EcDsStRequestManagerServer
		I0drg01	EcDsStFtpServer
		I0drg01	EcDsStArchiveServer
		I0acg02	STMGT Sybase Server
			AMASS
		I0acg02	SDSRV Sybase Server
		I0acs03	EcDsScienceDataServer
Fulfillment	FTP Push	I0dis02	EcDsDistributionServer
		I0drg01	EcDsStStagingDiskServer
		I0drg01	EcDsStCacheManagerServer
		I0dis02	EcDsStRequestManagerServer
		I0drg01	EcDsStFtpServer (PDPS)
		???	EcDsStFtpServer (all others)
		I0drg01	EcDsStArchiveServer
		I0acg02	STMGT Sybase Server
			AMASS
		I0mss21	EcMsAcRegUserSrvr
		I0mss21	EcMsAcOrderSrvr
		I0mss21	MSS Sybase Server
		I0acg02	SDSRV Sybase Server
		I0acs03	EcDsScienceDataServer
	FTP Pull	I0dis02	EcDsDistributionServer

		I0drg01	EcDsStStagingDiskServer	
		I0dis02	EcDsStRequestManagerServer	
		I0drg01	EcDsStFtpServer (PDPS)	
		???	EcDsStFtpServer (all others)	
		I0drg01	EcDsStArchiveServer	
		I0acg02	EcDsStPullMonitorServer (aka CacheManagerServer)	
		I0acg02		STMGT Sybase Server
				AMASS
		I0mss21	EcMsAcRegUserSrvr	
		I0mss21	EcMsAcOrderSrvr	
		I0mss21		MSS Sybase Server
		I0acs03	EcDsScienceDataServer	
		I0acg02		SDSRV Sybase Server
PDS	8 mm		SCLI	
		I0acs03	EcDsScienceDataServer	
				Rimage Power Tools
				Oracle
				PDS
	DLT		SCLI	
		I0acs03	EcDsScienceDataServer	
				Rimage Power Tools
				PDS
				Oracle
	CD-ROM		SCLI	
		I0acs03	EcDsScienceDataServer	
				Rimage Power Tools
				PDS
				Oracle
	DVD		SCLI	
		I0acs03	EcDsScienceDataServer	
				Oracle
				Rimage Power Tools
				PDS
User Reg		I0mss21	EcMsReqUserSrvr	
			EcCsDtUserProfileGateway	
		I0mss21		MSS Sybase Server
		offsite		EDG
Search MTMGW		I0ins01	EccCsMtMGateway	
Order MTMGW		I0acs03	EcDsScienceDataServer	ssh
		I0ins01	EccCsMtMGateway	
		I0acs03	EcDsScienceDataServer	
		I0acg02		SDSRV Sybase Server
Search EDG		I0ins02	EcDmV0ToEcsGateway	
		I0ins02	EcDmDictServer	
		I0ins02		DDICT Sybase Server
		offsite		EDG
		I0acg02		SDSRV Sybase Server
		I0acs03	EcDsScienceDataServer	
Order EDG		I0ins02	EcDmV0ToEcsGateway	
		I0ins02	EcDmDictServer	
		I0ins02		DDICT Sybase Server
		offsite		EDG
		I0acg02		SDSRV Sybase Server
		I0acs03	EcDsScienceDataServer	
Browse EDG		I0ins02	EcDmV0ToEcsGateway	
		I0ins02	EcDmDictServer	
		I0ins02		DDICT Sybase Server
		offsite		EDG
		I0acg02		SDSRV Sybase Server
		I0acs03	EcDsScienceDataServer	
All		I0icg01	EcCsRegistryServer	

	0icg01	Registry Sybase Server DCE, NFS
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## Functions Mapping to H/W & S/W (6A) at NSIDC

Function	Data Source	Hardware	Custom S/W	COTS S/W
Ingest & Archive	MODAPS			
Production	Ancillary			
Production	N/A			
Fulfillment	FTP Push	n0dis02	EcDsDistributionServer	
		n0drg01	EcDsStStagingDiskServer	
		n0drg01	EcDsStCacheManagerServer	
		n0dis02	EcDsStRequestManagerServer	
		n0acg01	EcDsStFtpServer	
		n0drg01	EcDsStArchiveServer	
		n0acg01		STMGT Sybase Server
				AMASS
		n0mss21	EcMsAcRegUserSrvr	
		n0mss21	EcMsAcOrderSrvr	
		n0mss21		MSS Sybase Server
		n0acg01		SDSRV Sybase Server
	FTP Pull	n0acs04	EcDsScienceDataServer	
		n0dis02	EcDsDistributionServer	
		n0drg01	EcDsStStagingDiskServer	
		n0dis02	EcDsStRequestManagerServer	
		???	EcDsStFtpServer	
		n0drg01	EcDsStArchiveServer	
		n0acg01	EcDsStPullMonitorServer (aka CacheManagerServer)	
		n0acg01		STMGT Sybase Server
				AMASS
		n0mss21	EcMsAcRegUserSrvr	
		n0mss21	EcMsAcOrderSrvr	
		n0mss21		MSS Sybase Server
		n0acs04	EcDsScienceDataServer	
		n0acg01		SDSRV Sybase Server
PDS	8 mm		SCLI	
		n0acs04	EcDsScienceDataServer	
				Rimage Power Tools
				Oracle
				PDS
	DLT		SCLI	
		n0acs04	EcDsScienceDataServer	
				Rimage Power Tools
				PDS
				Oracle
	CD-ROM		SCLI	
		n0acs04	EcDsScienceDataServer	
				Rimage Power Tools
				PDS
				Oracle
	DVD		SCLI	
		n0acs04	EcDsScienceDataServer	
				Oracle
				Rimage Power Tools
				PDS
User Reg		n0mss21	EcMsReqUserSrvr	
		n0ins02	EcCsDtUserProfileGateway	
		n0mss21		MSS Sybase Server
				EDG

<b>Search MTMGW</b>	n0ins01	EcCsMtMGateway	
	n0acs04	EcDsScienceDataServer	ssh
<b>Order MTMGW</b>	n0ins01	EcCsMtMGateway	
	n0acs04	EcDsScienceDataServer	
	n0acg01		SDSRV Sybase Server ssh
<b>Search EDG</b>	n0ins02	EcDmV0ToEcsGateway	
	n0ins02	EcDmDictServer	
	n0ins02		DDICT Sybase Server
			EDG
	n0acg01		SDSRV Sybase Server
<b>Order EDG</b>	n0acs04	EcDsScienceDataServer	
	n0ins02	EcDmV0ToEcsGateway	
	n0ins02	EcDmDictServer	
	n0ins02		DDICT Sybase Server
			EDG
<b>Browse EDG</b>	n0acg01		SDSRV Sybase Server
	n0acs04	EcDsScienceDataServer	
	n0ins02	EcDmV0ToEcsGateway	
	n0ins02	EcDmDictServer	
	n0ins02		DDICT Sybase Server
<b>All</b>	n0acg01		SDSRV Sybase Server
	n0acs04	EcDsScienceDataServer	
			EDG
	n0ica02	EcCsRegistryServer	
	n0icg02		Registry Sybase Server
			DCE, NFS

## Functions Mapping to H/W & S/W (6A) at SMC

Function	Data Source	Hardware	Custom S/W	COTS S/W
Ingest & Archive				
Fulfillment				
User Reg		m0mss16 m0css03 m0mss16	EcMsAcReqUserSrvr EcCIDtUserProfileGateway	MSS Sybase Server
Search (from ASTER GDS)		m0mss15/16?? m0mss15/16?? ??	EcDmAsterToEcsGateway EcDmDictService	DMS Sybase Server
Order (from ASTER GDS)		m0mss15/16?? m0mss15/16?? ?? m0mss16 ?? m0mss16	EcDmAsterToEcsGateway EcDmDictService DMS Sybase Server EcMsOrderSrvr Sybase replication server MSS Sybase server	
All		m0mss16 m0mss16	EcCsRegistry	Registry Sybase Server DCE NFS